

Figure 2-2f

$$\begin{cases} 19 = 5a + b \\ 6 = 10a + b \end{cases}$$

Substitute the given values of x and y into the equation of f .

$$-13 = 5a \Rightarrow a = -2.6$$

Subtract the first equation from the second to eliminate b .

$$6 = 10(-2.6) + b \Rightarrow b = 32$$

Substitute -2.6 for a in one of the equations.

$$\therefore f(x) = -2.6x + 32$$

Write the particular equation.

- e. Figure 2-2f shows the graph of f , which agrees with the given graph. Note that the calculated slope, -2.6 , is *negative*, which corresponds to the fact that $f(x)$ *decreases as x increases*.

Note that you could have solved the system of equations in Example 1 using matrices.

$$\begin{cases} 5a + b = 19 \\ 10a + b = 6 \end{cases}$$

The given system.

$$\begin{bmatrix} 5 & 1 \\ 10 & 1 \end{bmatrix} \begin{bmatrix} a \\ b \end{bmatrix} = \begin{bmatrix} 19 \\ 6 \end{bmatrix}$$

Write the system in matrix form.

$$\begin{bmatrix} a \\ b \end{bmatrix} = \begin{bmatrix} 5 & 1 \\ 10 & 1 \end{bmatrix}^{-1} \begin{bmatrix} 19 \\ 6 \end{bmatrix}$$

Multiply both sides by the inverse matrix.

$$= \begin{bmatrix} -2.6 \\ 32 \end{bmatrix}$$

Complete the matrix multiplication.

$$a = -2.6 \quad \text{and} \quad b = 32$$

You'll study the matrix solution of linear systems more fully in Section 13-2.

EXAMPLE 2 For the function graphed in Figure 2-2g,

- Identify the kind of function it could be.
- On what interval or intervals is the function increasing or decreasing? Which way is the graph concave, up or down?
- Describe something in the real world that a function with this shape graph could model.
- Find the particular equation of the function, given that points $(1, 76)$, $(2, 89)$, and $(3, 94)$ are on the graph.
- Confirm by plotting that your equation gives the graph in Figure 2-2g.

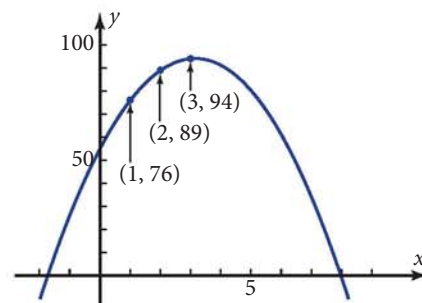


Figure 2-2g